Foreign Agriculture Report No. 7 August 1942

The Agricultural Resources of Madagascar

by Bertha Merdian

Junior Economist

OFFICE OF FOREIGN AGRICULTURAL RELATIONS

UNITED STATES DEPARTMENT OF AGRICULTURE

WASHINGTON, D. C.

CONTENTS

§

THE AGRICULTURAL RESOURCES OF MADAGASCAR

The strategically important position of Madagascar high-lights the island's capacity to produce food in excess of domestic requirements. Lying at the southwest entrance to the Indian Ocean and sheltering Mozambique Channel, it controls the shipping lanes between the Atlantic Ocean and the Red Sea, the Persian Gulf, India, and Ceylon. Rice, manioc, and corn, the basic food crops, are grown throughout the island, with substantial exports being made annually, chiefly to France. There are also exportable surpluses of cattle hides and beef. The crops produced principally for export to France include coffee, vanilla, cane sugar, legumes, oilseeds, fibers, fruits, and tobacco. Early in the current war the French authorities initiated plans for expanding the island's productive capacity. Information on progress under those plans is lacking, but it seems likely that occupation of the island's northern end by British forces has not interfered materially with the agricultural economy.

Famine has never been known in Madagascar. Its soil and climate are such as to insure the production of a wide variety of agricultural commodities. Of the few food items usually imported, the principal ones are flour and other farinaceous products. For the most part, native agriculture employs simple processes requiring few implements other than a long-handled spade. The use of modern methods and equipment is confined largely to French colonists or to native cooperative groups. Madagascar is dependent upon imports for manufactured consumer goods and for industrial equipment.

THE PEOPLE

Madagascar is sparsely populated, having an average density of about 15 persons per square mile. Since many of the 3,798,000 inhabitants are concentrated in the cities and smaller communities, large areas are entirely uninhabited. Of the total, about 3,758,000 are Malagasy, as the native tribes are called collectively; and of the remaining, 25,250 are French.

Although the island is separated from the African Continent by only a 250-mile channel, its culture is essentially that of the Indian and Pacific Ocean Islands. In physical appearance, customs, mental habits, and language the Malagasy share many of the characteristics of the Malayo-Polynesian-Melanesian races. Arab and Hindu elements, found most strongly in the northwest and southeast coastal areas, date from as early as the ninth century. Especially in their language is the Arabian influence seen, many legends and traditions having been preserved in a modified Arabic script. The influence of the African mainland is noted particularly along the west coast and

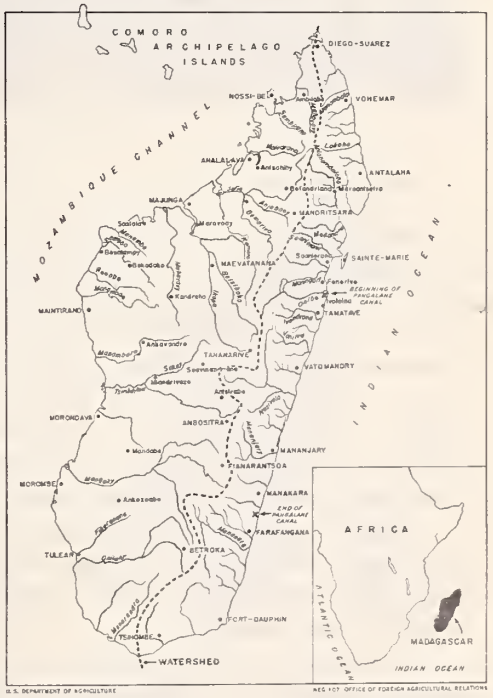

FIGURE 1.—Principal cities, rivers, and watershed of Madagascar.

in the interior, where the Mozambiques, or African slaves, settled after being freed in 1877.

The Malagasy are proud of their island and refer to it with such extravagant phrases as "all that is beautiful under the skies," and "thou that are in the midst of vast waters." For the most part they lead simple, carefree lives and work only enough to earn what they need for taxes and to supply their modest requirements. They are tillers of the soil, herdsmen, and traders. The leisurely tempo of their existence is exemplified in their modes of transportation - the slow oxcart and the filanzana, a kind of swinging chair on horizontal bars carried by natives. Motorcars are rare, and rail traffic is confined chiefly to the foreign population or to commerce between the larger trading centers. Possession of livestock, and especially cattle, is the highest worldly ambition of the native, whose standing in the community, like that of the native of central Africa, is determined by the size of his herd.

FIGURE 2.—Transportation by oxcart in Madagascar.

The chief population centers are on the central plateau and in the coastal regions. Tananarive, the capital and largest city, has 119,800 inhabitants. Its busy, modern atmosphere presents such a striking contrast to the surrounding area that it has been described as "a mountain with a city on its back, rising out of an ocean of rice fields." Antsirabé, the tourist center, with 18,200 population, is a short distance south of the capital. Fianarantsoa, also a modern city, lies at the southern end of the central rice area. Tamatave, Diégo-Suarez, and Majunga are on the east, north, and west coasts, respectively. Fort Dauphin is on the southeast, and Tuléar on the southwest. The arid, inland area of the south is the least populated. Nossi-Bé, an island of 130 square miles just off the northwest coast of Madagascar, has nearly 14,000 inhabitants.

French jurisdiction was definitely established in Madagascar in 1896, and since then the foreign trade of the island has been largely with the mother country. An important consequence of this development has been a stabilization of the island's commerce and industry.

Government of the colony is administered by a council of French citizens and natives, headed by a Governor General. As far as possible the native tribes have been granted autonomy in local affairs with native administrative officers, selected by popular vote. Each village has an organization (the fokon olona) resembling a commune, with a tribal chief at its head. Secondary education has been compulsory, and French the required language. At Tananarive there are schools of medicine, administration, industrial arts, and agriculture. Experimental work in agriculture has been carried on at Ivoloina, near Tamatave, at Ambatondrazaka, and at other stations.

PHYSICAL FACTORS AFFECTING AGRICULTURAL DEVELOPMENT

Location and Size

Madagascar lies almost wholly in the Tropics. From its northernmost point, about 12° below the equator, the island stretches southward in the Indian Ocean to slightly below 25°, a distance about equal to that from the lower tip of Florida to the Panama Canal. "La Grande Ile," as it is known to the French, isthe fourth largest island in the world. It is about 1,000 miles long, varies from 250 to 360 miles in width, and has nearly 3,000 miles of coast line. Including its dependencies, the Comoro Archipelago, Nossi-Bé, and Sainte-Marie, it covers 241,000 square miles, an area almost as large as the State of Texas.

Topography, Climate, and Vegetation

Although not clearly defined, there are four major physical regions in Madagascar; namely, a high central plateau, occupying roughly a third of the island; a narrow eastern chain of hills descending rather abruptly to the Indian Ocean; extensive rolling plains to the west sloping toward Mozambique Channel; and the arid slope to the south.

The over-all temperature ranges between about 55° and 95° F. Influenced by the general north-south direction of the elevations, climatic variations are most strongly marked between the east and the west coasts.

The high central region is the most populous, supporting about two-thirds of the entire population. Its mild, healthy climate is especially attractive to foreign residents of the island. Here the mean annual temperature ranges between a low of about 55° F. In July to a high of 68° or 70° in the warmest months, December-February. Rainfall is abundant in the summer, but during the remainder of the year ordinarily does not exceed 1 inch in any month.

A chaotic mountain mass, largely of volcanic origin, forms the main watershed along the eastern edge of the plateau. One of the highest points is known to the natives by the picturesque name Tsi-àfa-javona, meaning "that which the mist cannot climb." The interior highland is rolling, moorlike country. Between the irregular mountain ranges and volcanic highlands of red, claylike soil are fertile plains of lake alluvium, such as the Imerina and the Bétsiléo, whose rice fields have built towns like Tananarive and Fianarantsoa. Not all the soil is fertile, however; there are barren areas with little or no vegetation.

The narrow lowland along the east coast is sandy, hot, and humid, and particularly unhealthy because of its marshes. This is the region of heaviest rainfall, well distributed throughout the year. It usually exceeds 100 inches yearly, and reaches 116 to 120 inches in the Tamatave area (fig. 3). The influence

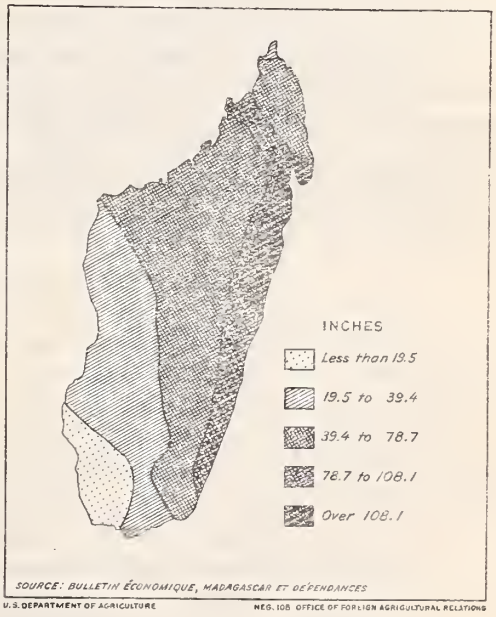

FIGURE 3.—Rainfall areas of Madagascar.

of the southeast trade winds is almost constant, and cyclones are prevalent between January and March. From this narrow coastal plain the ground rises in a succession of hills, with a marked change in plant life beginning at the lower elevations. Vegetation becomes more luxuriant as the slope ascends, with thick forests stretching along the summit of the plateau.

The west-coast climate is more variable. There are two distinct seasons, governed by the alternation between the trade wind and the monsoon. The warm, rainy season lasts from November to April; dry and cooler weather generally prevails during the rest of the year. This region is particularly adapted to grazing, and herds of zebus are numerous. The alluvial lowlands are frequently of high fertility, although they are interspersed with stretches of sandy soil.

The southern region is arid. Rainfall averages less than 20 inches yearly, often with long periods of drought. Plants adaptable to desertic conditions are about the only vegetation found in this part of Madagascar.

Dense tropical forest formerly covered much of the surface of Madagascar, particularly along the east slope and on the plains to the west and northwest. However, with the spread of cultivation much of it has been totally destroyed or reduced to scattered clumps of trees. Timber now occupies only about one-tenth of the area (table 1). To the west the natural vegetation is grass and occasional trees. Mangrove and palm forests line the northwest and west coast as far south as Morondava. Timber is rare on the central plateau, although woodland still remains in isolated areas. The scrub vegetation to the south is similar to the South African brush.

Among the many native trees, the most characteristic is the traveler's-tree *(Ravenala madagascariensis)*, so called because, by tapping its fanlike branches, clear, cool water may be obtained, even during the dry season. There are cabinet woods, chiefly ebony and rosewood; aromatic sandalwood; the raffia palm *(Raphia ruffia)*; several species of fan palms and *Ficus;* the Madagascar nutmeg, a large tree with fragrant fruit, leaves, and bark; and mangrove in thickets along the northwest coast. Eucalyptus, palms, bamboos, lianas, the cape lilac, and tree ferns have been introduced. There are numerous grasses, reeds, and rushes, many of them used in the native manufacture of hats, mats, baskets, and other items.

TABLE 1.—*Land utilization in Madagascar, 1935-37*

LAND USE	1935	1936	1937
	1,000 acres	*1,000 acres*	*1,000 acres*
Cropland:			
Domestic food crops	2,726	2,571	2,690
Export crops	522	588	626
Meadows and pasture	98,840	98,840	98,840
Woods and forests	14,826	14,826	14,826
Uncultivated land	29,616	29,705	29,548
Total	146,530	146,530	146,530

International Yearbook of Agricultural Statistics, 1940-41.

Communication Facilities

Considering its length, Madagascar's extensive coast line has relatively few indentations. Two-thirds of the east coast, from the Bay of Antongil southward, is almost an unbroken straight line, and its principal port, Tamatave, is protected by coral reefs only. Diégo-Suarez Bay, at the northern tip of the island, has a fine harbor. The northwest coast, where the mountains reach the sea, is broken by inlets, some of them landlocked and of considerable size. The low, flat coast line along the west is practically unbroken as far south as the estuary of the Onilahy river, or St.

Augustine Bay. The south coast, although higher, has no bays or capes of any size. Cargo movements are heaviest in the northern half of Madagascar. Tamatave, the principal port, cleared nearly 202,000 short tons annually.

The well-watered eastern slope is rich in short torrents with many waterfalls. At best the smaller streams become navigable only after reaching the lower plains. All are more or less closed by sandbars at their mouths and thus form an almost continuous series of lagoons and lakes along the coast. Canalization of this inland region has been started. When completed the Pangalanes Canal will provide the necessary facilities for coastwise traffic requiring shelter from the frequent storms.

On the more gradual western slope the rivers, although broken by rapids in their descent from the plateau, are longer and more important. Frequently they end in deltas. The largest is the Bètsibòka, joined on its left by the Ikopa, on which stands the capital. The Bètsibòka is navigable for some distance, and in the rainy season steamers go up the Ikopa as far as Maevatanana. In the north the Sofia has a fertile, well-populated valley. In the south, the Onilahy and the Mangòky are streams of considerable volume.

Land communications were largely undeveloped until 10 or 15 years ago. The present highway mileage is estimated at over 15,000 and rail at about 530.

Tananarive, in a prosperous agricultural district, is the principal distribution point for domestic commerce. At a distance of 240 miles from Tamatave, the chief seaport on the east coast, and 390 miles from Majunga on the northwest, it occupies a central position from which trunk roads radiate to other important regions. The railroad between Tamatave and the capital continues for 100 miles southward to Antsirabé, a tourist center that the Government has developed on a considerable scale. Because of its thermal springs, it has been called the Vichy of Madagascar.

Motor roads extend from Tananarive north to Diégo-Suarez, west to Majunga, and southward through the center of the island to Fort Dauphin and Tuléar. From the main trunk lines subsidiary roads lead to the principal outposts and to the less accessible regions. For the most part they are only dry-weather conveniences, without bridges, and impassable in times of heavy rainfall.

There are over 9,800 miles of telegraph and 7,800 miles of urban and interurban telephone lines. The Government maintains 24 wireless stations, the one at Tananarive forming part of the French intercolonial network.

AGRICULTURE

The soil fertility is high in many parts of Madagascar, and even in the drier regions production by irrigation and dry farming has been successful. Before French occupation the natives practiced irrigation quite successfully, chiefly of rice. There are now about 1.5 million acres under irrigation, and the government, through the Service de l'Hydraulique Agricole de Madagascar, made plans before the war for extension of the irrigated acreage to 2.5 million. Several storage dams have been constructed. Because of the hilly topography of the country, gravity furnishes much of the power needed. Only a few pumping plants are required. The Mantasoa Dam near Tananarive, furnishes the water supply and electric power for the capital and is also used for flood control and irrigation purposes. The potential water power of Madagascar has been estimated at approximately 5 million kilowatts; only a small part has as yet been utilized.

To further the agricultural development of Madagascar, a credit fund was established in 1930 through which financial aid was made available at low cost. This "crédit agricole" has been sufficiently flexible in its operation to be adaptable to

existing local conditions and to give real aid to native economy. Its value is indicated by the fact that during the first 6 years of its existence loans of over 5 million francs were made. Organization among farmers was encouraged, and by 1940 over 300 native and 24 French marketing cooperatives were active, with a total membership of 10,000 and capital of a million francs.

The wartime economy of Madagascar prior to British occupation did not differ very materially from its organization during peacetime, except that the cultivation of all products, and especially food items, was intensified. By decree of September 8, 1939, the French Government established general and regional agricultural committees, whose purpose it was to determine the labor, equipment, and fertilizer requirements of the colony, to increase agricultural production, and to submit proposals with respect to credit distribution and the organization of transportation facilities.

Every means was adopted to prevent any interruption of agricultural production due to the recruiting of soldiers or workers. All districts were asked to meet their own requirements and to supply the maximum quantities for delivery outside of Madagascar. Abandoned rice fields were resown, and the acreage devoted to beans, peas, and other vegetables was expanded. The French Government allocated 41 million francs to the local government for the construction of experiment stations to develop improved varieties of coffee trees and the establishment of coffee-processing plants. The maximum cultivation of sugarcane was encouraged, and planters and processors were urged to have all ripe sugarcane treated. To accomplish this, indispensable technicians were ordered to return to the factories. The Minister of Colonies ordered that a special effort be made to increase the supply of castor-beans available for the French Munitions Service.

A substantial increase in coconut fiber was anticipated, and natives were asked to sell their coconut shells to processing plants for conversion into fuel. To develop further the production of fibers, the services of technicians for processing sisal were made available to that industry. Native cultivation of agaves was requested in the vicinity of processing factories where local transportation facilities were available.

British occupation of the northern end of Madagascar did not interrupt to any substantial degree the agricultural programs initiated by French authorities.

Extent of the Industry

Although native agriculture is carried on to some extent everywhere in Madagascar, only a relatively small part of the land is devoted to crops. Of a total of over

TABLE 2.—*Acreage of principal crops in Madagascar, 1935-37*

CROP	1935	1936	1937	CROP	1935	1936	1937
	1,000 acres	*1,000 acres*	*1,000 acres*		*1,000 acres*	*1,000 acres*	*1,000 acres*
Food crops:				Export crops:			
Rice	1,297	1,200	1,191	Coffee	192	232	269
Corn	222	216	280	Cloves	78	82	82
Millet	1	4	4	Bananas	45	45	45
Manioc	677	618	642	Vanilla	35	54	55
Sweetpotatoes	301	297	309	Coconuts	37	40	40
Peas	58	71	73	Sugarcane (harvested)	35	35	35
Beans	80	77	101	Sisal	13	13	13
Taros	38	40	40	Cacao	3	2	3
Others	52	48	50	Others	84	85	84
Total food crops	2,726	2,571	2,690	Total export crops	522	588	626
				Total acreage	3,248	3,159	3,316

International Yearbook of Agricultural Statistics, 1940-41.

146 million acres, a little more than 3 million are under cultivation. Food crops, chiefly for domestic consumption, occupy approximately 2.7 million acres (table 2).

Surplus Food Products

Surplus production of basic food crops, as indicated by the quantities exported, has varied from year to year. Rice exports, which averaged nearly 95 million pounds between 1921 and 1925, declined appreciably in the following decade, largely because of the abandonment by native farmers of considerable acreages that had been devoted to rice. A resumption of plantings, however, is indicated in the upturn in exports in 1938.

Surplus production of corn has shown a steady and substantial increase; namely, from less than an average of 200,000 pounds in 1906-10 to over 118 million pounds in 1938. Manioc, or cassava, exports had become important by 1921-25. The volume has been maintained at relatively the same level, either in the raw state or processed into flour, tapioca, or starch. Large surpluses of animal products, especially beef and hides, have been available for export each year.

Rice

Rice, one of the basic foods, is grown in every part of Madagascar. Over a million acres are devoted to this crop, which annually amounts to about 900 million pounds of cleaned rice. A very fine quality is produced. The largest rice fields are on the central plateau. A large area, the Marovoay Valley near Majunga, in the northwest section of the island, has been drained and planted to rice. Development of drainage, flood control, and sanitation have made of this swampland an important agricultural region. The soil is fertile and produces three crops of rice annually, which are harvested in March, July, and December. At Madirokely an agricultural station has experimented in rice selection and has adapted successfully the type locally known as Carolina rice. Its hull is golden or yellow, and the grain is long and white.

FIGURE 4.—Rice terraces of Central Madagascar.

The domestic rice crop is usually sufficient to meet consumption needs, with a substantial exportable surplus (table 3). The volume of exports has varied from year to year, with a peak of over 175 million pounds in 1924. Between 1931 and 1937, when exports were drastically reduced, imports were unusually heavy; in 1934 over 67 million pounds of rice were imported. Imports, if any, however, are usually small. Exports have gone chiefly to France, and only small quantities to nearby markets.

TABLE 3.—*Exports of rice from Madagascar, 1906-10 to 1938*

PERIOD	QUANTITY	PERIOD	QUANTITY
	1,000 pounds		*1,000 pounds*
1906-10	9,442	1931-35	7,082
1911-15	20,691	1936	5,398
1916-20	45,185	1937	8,833
1921-25	94,752	1938	24,948
1926-30	16,735		

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Corn

Approximately 250,000 acres are planted to corn in Madagascar. The west coast and the central districts are the chief producing areas. Corn is still widely grown in small plots by the natives, but for a time the trend was toward increased cultivation of beans in place of corn. A definite upswing was noted in 1937 and 1938, however. Corn exports have been increasing in volume (table 4). Normally France takes nearly the entire surplus, relatively small quantities going to Mauritius, Réunion, and other markets.

TABLE 4.—*Exports of corn from Madagascar, 1906-10 to 1938*

PERIOD	QUANTITY	PERIOD	QUANTITY
	1,000 pounds		*1,000 pounds*
1906-10	191	1931-35	15,137
1911-15	1,164	1936	35,016
1916-20	3,540	1937	74,956
1921-25	22,103	1938	118,775
1926-30	18,111		

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Manioc

Cultivation of manioc, or cassava, is extensive. The roots of this large woody tropical plant constitute one of the staple foods. Individual roots may reach 8 inches in diameter and 4 feet in length, the clusters weighing as much as 30 pounds. Over 700,000 acres are planted to manioc, including many small, scattered patches. The annual harvest is substantial but difficult of estimation as so much of it is consumed locally by the natives or fed to livestock. The surplus is exported in its raw state, or processed as flour, starch, or tapioca (table 5). France normally obtains about 75 percent of its consumption needs from this colony, and in times of feed shortage increases imports of the raw product.

TABLE 5.—*Exports of manioc, raw and processed, 1906-10 to 1938*

PERIOD	RAW	FLOUR	STARCH	TAPIOCA	PERIOD	RAW	FLOUR	STARCH	TAPIOCA
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1906-10	[1] 5,257	(2)	131	(2)	1931-35	61,822	4,479	2,953	12,303
1911-15	38,207	1,460	2,062	[3] 1,158	1936	45,692	4,022	4,747	23,259
1916-20	19,499	6,343	4,138	1,295	1937	40,597	4,861	4,479	24,114
1921-25	61,377	8,809	3,102	2,572	1938	65,327	2,209	4,479	19,817
1926-30	77,534	2,482	1,959	4,559					

[1] 2-year average, 1909-10.

[2] Not shown.

[3] 3-year average, 1913-15.

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Manioc was introduced into Madagascar from Brazil during the eighteenth century. Its cultivation requires little labor, as the plant is hardy and thrives well at varying altitudes and climates. It does not grow successfully in excessively humid climates or in areas frequently inundated.

Livestock and livestock products

Cattle are raised in all sections of Madagascar, but are most numerous in the north-central, northwestern and west-central Provinces. The number officially reported approximates 5 million, but it is estimated that the total is considerably higher, averaging about two animals for every inhabitant.

The cattle are mostly zebus, characterized by small stature and a hump over the shoulders. They are sturdy and adjust themselves to the changing feed supply, which in the warm rainy season is abundant and in the cooler dry season in some regions is sparse. Seldom are they fed or otherwise especially provided for but are left to graze on whatever vegetation is available. They therefore mature slowly and are rather small, rarely exceeding 750 or 800 pounds.

Hogs, used principally by the meat-packing industry, are produced in many parts of the island, but principally on the plateau. Sheep are raised in the plateau region and in the south. They are largely of the flat-tailed low-wool-bearing variety, and are used locally for food. Wool produced on an experimental farm near Tananarive is sent to France, where it is made into rugs and hangings.

Chickens are common, and are a popular native food. Some ducks, geese, and turkeys are raised. There are a few ostrich farms, operated by Europeans.

TABLE 6.—*Livestock production and slaughter in Madagascar, 1935-37*

KIND	1935	1936	1937
	Number	*Number*	*Number*
Production:			
Horses	2,000	2,000	2,200
Donkeys	900	900	800
Mules	50	50	45
Cattle	5,459,100	4,990,300	4,947,000
Sheep	207,000	208,000	190,700
Goats	150,000	150,000	155,000
Hogs	650,000	650,000	550,000
Poultry:			
Chickens	4,500,000	4,500,000	4,600,000
Laying hens	[1] 2,600,000	[1] 2,600,000	[1] 2,700,000
Geese	250,000	250,000	280,000
Ducks	500,000	500,000	600,000
Turkeys	150,000	150,000	140,000
Others, including guinea fowl, pigeons, and ostriches	115,047	115,045	115,040
Slaughter:			
Cattle	474,243	503,062	535,706
Hogs	100,858	108,440	112,047
Sheep	8,870	10,129	10,784

[1] Which produced 156 million eggs in 1935, 156 million in 1936, and 162 million in 1937.

International Yearbook of Agricultural Statistics, 1940-41.

The largest meat-packing establishments are located on the west coast near Majunga, on the northeast near Diégo-Suarez, and in the interior at Tananarive. Another plant is on the east coast near Tamatave.

The meat supply far exceeds home-consumption needs, since, with the exception of fowls, meat does not constitute an important item of diet among the Malagasy. Quantities, therefore, are exported. Some live animals are shipped to the neighboring

islands of Réunion and Mauritius, but normally the number does not exceed 9,000 or 10,000. Animal products account for from 15 to 20 percent of the total value of exports. France takes the bulk of these exports. Smaller quantities go to other European countries and Réunion.

TABLE 7.—*Exports of animal products from Madagascar, 1938*

KIND	QUANTITY	KIND	QUANTITY
	1,000 pounds		*1,000 pounds*
Fresh meat:		Hides and skins:	
Beef, refrigerated	13,538	Cattle:	
Pork and other meat	509	Dry	1,223
Poultry, refrigerated	11	Green, salted	3,213
Meats, salted or prepared:		Arsenicated	7,919
Beef	616	Sheep and goat, arsenicated	2
Pork	169	Crocodile	90
Sausage, etc.	1,301	Horns, raw and prepared	11
Meats, canned:		Lard	2,264
Beef	8,461	Suet and tallow	1,561
Pork	149	Fertilizer	266
Poultry and game	8	Miscellaneous products	28
Extracts	76	Refuse	49

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

The trade in hides and skins is one of the oldest industries of Madagascar. Exports before the French occupation went to the Western Hemisphere as well as to Europe. When early American sailing vessels traded with this island, their return cargoes consisted largely of hides and skins. This trade has continued with European countries - particularly France, the United Kingdom, and Germany, but shipments to the United States have practically ceased because of the increasing local supply and the accessibility of hides from South American sources.

By 1900 exports of skins from Madagascar amounted to over a million pounds. The quantity rose gradually to a peak in 1923 of over 23 million.

TABLE 8.—*Exports of hides and skins from Madagascar, 1901-5 to 1938*

PERIOD	QUANTITY	PERIOD	QUANTITY
	1,000 pounds		*1,000 pounds*
1901-5	3,371	1926-30	18,022
1906-10	10,341	1931-35	11,282
1911-15	15,722	1936	13,180
1916-20	16,795	1937	16,559
1921-25	17,634	1938	12,357

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Crops Grown for Export

Agricultural production for export, particularly to France, has encouraged the development of cash crops, principally coffee, sugarcane, legumes, oleaginous vegetables, fibers, fruits, tobacco, and beef. Madagascar has also become an important world source of vanilla and cloves.

Coffee

Coffee is the principal money crop, annually accounting for over 30 percent of the total value of exports. Since about 1936, Madagascar has been an important world coffee source; it ranked sixth in 1938, when the volume of its coffee exports exceeded 686,000 bags (91 million pounds). Very little of this product reaches world markets,

however, as France draws heavily on this colony for its coffee supply. As high as 99 percent of exports have been shipped to France and the French island of Réunion.

Madagascar produces a good grade of mild coffee. The principal varieties are those known as small coffees (including *Coffea robusta* and *C. canephora*), and some *liberica* and *arabica*. The eastern coastal plain, between Tamatave and Mananjary is the important producing area; there the small coffees and *liberica* are grown. *Arabica*, the finest of Madagascar coffees, is grown near Tananarive on the plateau.

In view of the general backwardness in economic development of the island, the coffee industry stands out for its remarkable progress. Since about 1920, when exports had become substantial, a 500-percent rate of increase has been maintained each decade. This increase was due, no doubt, to the certain market that existed in France, whose consumption capacity exceeded colonial production.

The rapid expansion in the coffee industry, however, resulted in a lack of coordination between production and marketing. In areas where depulping machines had not been installed, the product was of low quality because of the use of primitive curing methods and equipment. Furthermore, small producers did not always receive from dealers appropriate returns for their coffee. The government sought to remedy this situation by providing curing equipment in isolated villages and by setting up in the more important centers cooperatives to improve the curing and grading of coffee for export.

The Ivoloina experiment station was established at Tamatave to carry on a scientific study of coffee culture in Madagascar. Here natives have been trained in all phases of the coffee industry and in the profitable administration of their coffee plantations. The government has planned to continue experimentation in coffee culture during the present war and to construct an additional experiment station and coffee-processing plants. It is expected that by 1945 increased plantings of *arabica* coffee trees will have been extended over an additional 30,000 acres of the Ankaizina area.

TABLE 9.—*Exports of coffee from Madagascar, 1906-10 to 1938*

PERIOD	QUANTITY	PERIOD	QUANTITY
	Bags[1]		*Bags*[1]
1906-10	1,351	1931-35	233,524
1911-15	4,904	1936	463,172
1916-20	13,825	1937	353,561
1921-25	38,162	1938	686,733
1926-30	73,552		

[1] Of 60 kilograms, or 132.276 pounds.

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Vanilla

Bourbon vanilla, derived from the vanilla bean grown in Madagascar, ranks with, or is a close second to, the finest grades from Mexico.[1] In quantity of raw product, Madagascar is about third among world sources, the principal of which are Tahiti, Mexico, Madagascar, Réunion, Java, and the Seychelles Islands.

The vanilla plant (*Vanilla planifolia*) is a climbing orchid whose fragrant fruit, or pod, is the source of one of the most widely used flavorings. The vines are started from slips and attach themselves to supporting plants. From the hanging vines drop long aerial roots, which fasten themselves to the soil. Development of the vanilla

[1] See MALLORY, L. D., AND COCHRAN, WILLIAM P., JR. MEXICAN VANILLA PRODUCTION AND TRADE. Foreign Agr. 5: 469-488, illus. 1941.

vine and fruit usually requires about 3 years and involves much hand labor. The productive life of a plantation is relatively short, only 4 or 5 years in some regions, 9 or 10 in others.

The plant thrives well in the tropical areas of Madagascar and its island dependencies. The chief producing regions are the northern part of the east coast, the Comoro Archipelago, and the island of Nossi-Bé. The size of the harvest has varied considerably - between 1935 and 1937 from 660,000 to 1,102,000 pounds. The area planted to vanilla now is estimated at over 55,000 acres, and new plantations, begun about 1938 or 1939, are likely to augment production by about 20 percent. Any consistent increase, of course, will depend upon weather conditions - cyclones in Madagascar always representing an incalculable factor.

FIGURE 5.—Madagascar vanilla vine with full grown pods.

There is only one crop a year, but since the pods do not ripen simultaneously, the harvest and curing period extends from about September to March. The quality of bean depends greatly upon proper cultivation and careful curing, including a long slow drying process.

Vanilla production is carried on by natives, Indians, and Chinese and the marketing by Indian and Chinese middlemen and exporters. Wide price fluctuations in the local market have been a deterring factor to stabilization of production. There has existed, however, an economic price ceiling influenced by the price level at which consumption in the United States could be maintained at maximum capacity without encouraging substitution.

Vanilla ranks second in value among exports from Madagascar. Exports showed a definite uptrend by 1916-20 and reached a peak in 1929 at 2.4 million pounds. Although official statistics indicate a preponderance of shipments going to France and relatively small quantities to the United States, a large part of the annual crop has reached the United States as reexports from France. This is indicated by the fact that in recent years about 70 percent of the vanilla consumed in the United States has been Bourbon from Madagascar.

TABLE 10.—*Exports of vanilla from Madagascar, 1906-10 to 1938*

PERIOD	QUANTITY	PERIOD	QUANTITY
	1,000 pounds		*1,000 pounds*
1906-10	103	1931-35	1,432
1911-15	253	1936	1,221
1916-20	736	1937	690
1921-25	883	1938	830
1926-30	1,561		

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Spices and essential oils

Cloves and clove oil.- Madagascar is the second largest world source of cloves. Begun in 1874, the industry has developed into a sizable money crop. Over 10,183,000

pounds of dried cloves and 673,000 pounds of clove oil were exported in 1938, together representing about 6 percent of the total value of exports for that year. Approximately 82 million acres are devoted to clove production. This is primarily a native industry, the size of plantings varying from small plots of 10 to 50 trees to plantations of several thousand trees. Frequently cloves are interplanted with coffee. The harvest begins in October or November and is completed by the end of December. The general absence of heavy rains during this season favors the production of cloves of fine quality and uniform color. The cultivation of cinnamon, ilang-ilang, citronella, and other essential-oil plants has attracted the attention of the clove growers of Madagascar as feasible of simultaneous cultivation with cloves.

The clove tree requires an atmosphere of tropical humidity and protection from strong winds. The sheltered areas on Madagascar's east coast are especially favorable to its growth. Warm and moist breezes prevail, and the leeward slopes afford protection. The principal clove district extends from Marantsetra in the north, down the coast about 400 miles and includes nearly all of Sainte-Marie Island, where clove trees literally cover the lower slopes and valleys. There are approximately 5 million clove trees in Madagascar, 4 million of which are in the neighborhood of Fenerive-Soanierana.

The primary use of cloves is as a spice, but the distillation of the essential oil contained in cloves, and particularly the stems and leaves of the tree, is a flourishing branch of the industry. Clove essence from Madagascar has been popular with French perfumers because of its particularly agreeable fragrance. Of the five large distilleries in Madagascar, one, French owned and operated, obtains its raw material from native producers; the other four are operated by plantation owners, one an Indian, two French colonists, and one a native.

The demand for Madagascar cloves and clove oil has increased notably since about 1921 (tables 11 and 12). Exports have been made to nearly all of the markets of North America, Europe, and Asia, but principally the United States, France, England, Germany, British India, the Netherlands Indies, Italy, Denmark, and Belgium. Only occasional shipments have gone to Latin American countries. France has been the leading consumer of clove oil, but substantial quantities have gone also to England, the Netherlands, the United States, and Japan.

TABLE 11.—*Exports of cloves to Madagascar, 1906-10 to 1938*

PERIOD	QUANTITY	PERIOD	QUANTITY
	1,000 pounds		*1,000 pounds*
1906-10	212	1931-35	4,688
1911-15	365	1936	7,362
1916-20	510	1937	6,496
1921-25	1,317	1938	10,184
1926-30	2,089		

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Other spices and essential oils.- Other spices exported from Madagascar include cinnamon, pepper, and pimento. In 1938, nearly 253,000 pounds of cinnamon were exported to England, France, and the Netherlands. Pepper exports, averaging between 300,000 and 400,000 pounds in recent years, have gone chiefly to France, with some to Zanzibar and other countries. The quantity of pimento exports has increased and in 1938 amounted to 254,000 pounds, going principally to France and Réunion.

Production of essential oils, other than clove, includes that of lemon-grass, ilang-ilang, rose-geranium, cinnamon, patchouli, basil, palmarosa, and vetiver. The

perfume and soap industries of France normally absorb all available exports, with the exception of ilang-ilang, considerable quantities of which are destined for the United States. Small shipments go to England, Denmark, Germany, and other countries. See table 12.

TABLE 12.—*Exports of essential oils from Madagascar, 1906-10 to 1938*

PERIOD	CLOVE	LEMON-GRASS	ILANG-ILANG	OTHER	TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1906-10	(1)	(1)	(1)	(1)	1
1911-15	2	(1)	[2] 3	[2] 7	12
1916-20	4	[3] 21	10	14	49
1921-25	39	25	23	13	100
1926-30	150	76	50	9	285
1931-35	305	118	49	11	483
1936	525	141	82	10	758
1937	521	121	82	6	730
1938	673	76	63	17	829

[1] If any, included in "other."

[2] 4-year average, 1912-15.

[3] Year 1920.

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Dried legumes

Production for export of lima, kidney, and other beans is a growing industry of Madagascar. Approximately 69,000 acres are devoted to lima, 79,000 to kidney, and 26,000 to other types. Lima beans are cultivated principally on the alluvial plains to the west and south, between Maintirano and Tuléar. Attempts to extend cultivation beyond this zone have been unsuccessful, as the product grown elsewhere does not have the flavor and other qualities sought. Planting takes place in April or May and the harvest 5 or 6 months later.

The crop is gathered and prepared for market by hand. Sorting and classification depend chiefly on color, the grades consisting, first, of large, perfectly sound, all white beans; second, of white beans, smaller in size or with blackish stains due to some decomposition of the pod; and, third, of beans colored more or less red, or blackened, and broken ones.

Nearly the entire crop of lima beans is exported. The first and second grades are sold mainly to Great Britain. The third is used for cattle feed, either locally or in France. Kidney and other beans are grown in many parts of Madagascar. Exports go principally to France, Réunion, and Mauritius. See table 13.

TABLE 13.—*Exports of dried legumes from Madagascar, 1906-10 to 1938*

PERIOD	LIMA BEANS	OTHERS	TOTAL	PERIOD	LIMA BEANS	OTHERS	TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1906-10	5,048	468	5,516	1931-35	32,021	2,312	34,333
1911-15	15,885	1,486	17,371	1936	52,242	4,348	56,590
1916-20	35,946	4,032	39,978	1937	34,808	7,101	41,909
1921-25	31,181	4,043	35,224	1938	30,422	9,621	40,043
1926-30	31,800	6,088	37,888				

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Sugar

Sugar production in Madagascar is of little importance from the standpoint of the world total; however, the industry is becoming more important in the economy of the

island and as a source of supply to France. Over 26.6 million pounds of raw sugar were exported from Madagascar in 1938 as against one-third that amount a decade earlier. Progress in the industry is further indicated by the substantial increase in exports compared with the relatively stable rate of importation (table 14).

The government has encouraged the development of this industry, particularly among planters in the vicinities of established sugar mills. The largest mill is on Nossi-Bé; others are at Soalalo, Brickaville, Tamatave, and two on the Comoro Islands.

The area now planted to sugarcane approximates 46,000 acres. The crop season begins with planting in September and closes with the harvest, usually about August of the following year. Cane crushing extends from June to October on the northwest coast and from July to November on the east coast.

The island of Nossi-Bé is the center of the industry. Almost its entire output is exported to France by the end of each year. Carry-over stocks are usually low, since production on the mainland of Madagascar is insufficient to meet domestic requirements. Consumption of over 9 million pounds is supplied largely by imports from the island of Réunion, because of the local preference for a sweeter sugar than that produced in Madagascar and the more direct and better shipping connections between Réunion and the principal consuming centers of Madagascar.

TABLE 14.—*Sugar trade of Madagascar, 1906-10 to 1938*

PERIOD	EXPORTS[1]	IMPORTS[1]	PERIOD	EXPORTS[1]	IMPORTS[1]
	1,000 pounds	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*
1906-10	[2] 12	2,175	1931-35	15,050	5,458
1911-15	[2] 72	2,337	1936	18,649	2,068
1916-20	329	2,957	1937	20,898	3,929
1921-25	2,970	2,831	1938	26,678	3,673
1926-30	8,289	8,140			

[1] Exports, largely raw; imports, largely refined.

[2] 2-year average.

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Oleaginous vegetable seeds and nuts

The oleaginous vegetable seeds and nuts produced in Madagascar include castor-beans, coconuts, curcas seed, cashew nuts, baobab seed, cottonseed, and other types common to tropical countries. With the exception of peanuts, production is practically identical with exports, since domestic consumption is negligible (table 15).

Peanuts are sold at retail by street vendors, and local consumption is considerable. About 18,000 acres were planted to peanuts in 1937, from which a harvest of 18 million pounds was obtained. Only about one-third of that quantity was exported.

TABLE 15.—*Exports of oleaginous vegetable seeds and nuts from Madagascar, 1906-10 to 1938*

PERIOD	COPRA	PEANUTS	CASTOR-BEANS	CURCAS SEED	OTHERS	TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1906-10	(1)	(1)	(1)	(1)	(1)	262
1911-15	(1)	(1)	(1)	(1)	(1)	1,508
1916-20	(1)	(1)	(1)	(1)	(1)	2,807
1921-25	1,886	4,494	1,901	2,219	450	10,950
1926-30	2,792	4,678	3,201	2,526	850	14,047
1931-35	2,687	312	3,442	[2] 38	106	6,585
1936	3,504	192	7,593	-	44	11,333
1937	2,601	526	5,252	16	157	8,552
1938	7,076	677	5,566	-	25	13,344

[1] Not shown separately.

[2] 2-year average.

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Since 1920 the cultivation of peanuts has been undertaken on a fairly large scale by French firms, particularly in the alluvial region of Lake Alaotra. They grow well also in the northern end of the island, near Diégo-Suarez. The best results have been obtained from the Valencia and Buitzenzorg varieties, yielding an oil content of from 49 to 50 percent. A good quality of peanut oil is produced at a factory near Tananarive. Exports of peanuts reached a peak in 1925 with 11 million pounds but declined rapidly thereafter and in 1938 totaled only 677,000 pounds.

Export production of copra and castor-beans has shown a definite uptrend since about 1920. Any substantial expansion in the production of coconuts, however, is likely to be diverted to the coco-fiber industry or to the use of coco shells for fuel.

Castor-beans are gathered from the plentiful wild growth of the castor-oil plant *(Ricinus communis)*, particularly in the Provinces of Fort Dauphin and Tuléar in the southern part of Madagascar. Approximately 11,000 acres are devoted to this crop. Expansion of the industry has been encouraged by the government, and in 1940 steps were taken to increase the personnel of the agricultural propaganda service, particularly in the southern districts.

Curcas seeds *(Jatropha curcas)* are grown in the vanilla regions, particularly in the Comoro Islands, Nossi-Bé, and along the northeast coast, where the plant serves as a support for the vanilla vines. The name "Indian piñon nut," as the plant is called locally, doubtless indicates its origin. Its seeds are rich in oil, of a fixed, nondrying variety, that may be used for medicinal or illuminating purposes.

FIGURE 6.—Raffia palms in Madagascar.

Cashew nuts are grown in limited quantities on the northwest coast, between Majunga and Nossi-Bé. Most of the exports are to the large oil and allied products industry of Marseilles. Of the castor-beans, curcas, and other seeds, France normally takes the entire export, although small shipments have been made to England, Belgium, and other countries. Peanuts go chiefly to Mauritius and Réunion, and copra principally to France.

Large quantities of vegetable oil are extracted for export. In 1938 nearly 100,000 pounds of peanut oil and 82,000 pounds of coconut oil were exported, chiefly to the island of Réunion.

Vegetable fibers

Vegetable fibers produced in Madagascar include raffia, sisal, piassava, coir, paka,[2] kapok, and others. Large quantities are used locally and in the domestic manufacture of bags, baskets, mats, and other articles of tourist trade and export.

[2] *Urena lobata.*

Detailed statistics of production on the various fibers are not available, but their relative importance is indicated by the quantities exported. Of the principal items, raffia represents 70 percent of the total and sisal about 25 percent. Exports of raw paka are unimportant, but, when included with manufactured paka articles, exceed 3 million pounds (table 16).

TABLE 16.–*Principal vegetable fiber exports from Madagascar, 1938*

RAW FIBERS	QUANTITY	MANUFACTURES	QUANTITY
	1,000 pounds		*1,000 pounds*
Raffia	15,284	Paka:	
Sisal	5,439	Bags	2,905
Piassava	207	Textile	200
Coir	161	Cordage	118
Paka	85	Mats	118
Others	14		
Total	21,190	Total	3,341

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Raffia forests are located principally on the marshlands along the northwest and east coasts of Madagascar. They rarely exceed 450 to 500 acres in size. The best quality, known as Majunga (the port from which it is exported), generally is obtained from the west coast. Its cream-colored fiber is long, smooth, and quite large.

Vegetable fibers account for approximately 10 percent of the total value of exports. The largest shipments have gone to France, to cover the needs of that country and for reexport to neighboring markets. Direct shipments from Madagascar to foreign countries also have been important (table 17).

TABLE 17.–*Exports of vegetable fibers from Madagascar, 1906-10 to 1938*

PERIOD	RAFFIA	OTHER FIBERS	TOTAL	PERIOD	RAFFIA	OTHER FIBERS	TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1906-10	9,869	227	10,096	1931-35	13,502	3,521	17,023
1911-15	12,521	306	12,827	1936	16,243	6,406	22,649
1916-20	11,546	332	11,878	1937	18,681	7,212	25,893
1921-25	11,122	1,476	12,598	1938	15,284	5,906	21,190
1926-30	16,367	4,579	20,946				

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

Forest Products

With the disappearance of an abundant tropical vegetation, exports of forest products, other than fibers, have gradually declined. Cabinet woods, principally rosewood and ebony, are supplied to France and to a few other European markets. Aromatic woods, chiefly sandalwood, are exported in small quantities only. Shipments of construction lumber, rough or sawed, go to Réunion, India, and other nearby countries.

Exports of tannins, principally mimosa, mangrove, and lichens, have gone chiefly to France, the Netherlands, and England (table 18).

Crude-rubber production reached its greatest volume during the first decade of the present century, exports in 1906 and 1910 amounting to approximately 2.8 and 2.5 million pounds, respectively. In recent years they have been relatively unimportant (table 18).

Several species of *Landolphia* and *Mascarenhasia* are the main rubber-producing plants of Madagascar. The latex is obtained by incision and allowed to coagulate. In general, the trees and vines, which grow wild, are destroyed when the latex is collected.

In the past the gathering of rubber was considered by the administration as an unlimited right of use and exempt from regulation. A few years, however, sufficed for the almost complete destruction of the existing rubber plants. Progressive denuding of forest areas preparatory to the cultivation of food crops also aided in the practical elimination of rubber production.

To regain Madagascar's productive capacity would require an increase in the high-yielding native plants in suitable forest areas and the introduction of foreign rubber trees *(Hevea, Castilla, Manihot)* where they are likely to succeed. Experimental attempts at establishing rubber plantations in Madagascar, however, are said to have been abandoned as unprofitable.

TABLE 18.—*Exports of forest products from Madagascar, 1906-10 to 1938*

PERIOD	WOODS			MIMOSA, MANGROVE, LICHENS, AND OTHER TANNINS	RUBBER	COPAL AND OTHER GUMS AND RESINS
	CONSTRUCTION	CABINET	AROMATIC			
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1906-10	3,604	4,637	(1)	31,867	1,936	44
1911-15	4,895	5,158	(1)	55,313	919	78
1916-20	9,117	2,883	[2] 155	5,372	91	26
1921-25	6,915	4,727	442	13,523	54	43
1926-30	2,449	5,228	209	13,766	60	481
1931-35	1,684	941	173	3,458	(3)	58
1936	870	482	29	1,044	44	7
1937	799	386	5	1,499	88	12
1938	548	1,003	74	2,284	7	139

[1] Not shown.

[2] 2-year average, 1919-20.

[3] Less than 500.

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances.

FOREIGN TRADE

The foreign trade of the island is largely in the hands of long-established trading companies. Over half its volume is handled by a relatively few large firms with headquarters in France, who, in addition to acting as importers and exporters, engage extensively in private enterprise. Numerous commercial houses - French, Malagasy, British, Chinese, and Indian — operate on a smaller scale or handle only specialized lines, such as, textiles, building material, foodstuffs, or metal goods.

Madagascar's foreign-trade volume has developed substantially under French jurisdiction. This is true particularly of exports, which increased from 25 million pounds in 1900 to 612 million in 1938 (table 19). As is usual of countries with little industrial development, exports have consisted largely of raw materials and imports of industrial goods. Graphite, phosphates, cloves, vanilla, essential oils, and vegetable fibers, have been the principal exports to the United States. This country, in turn,

TABLE 19.—*Foreign trade of Madagascar, by volume, 1896-1938*

PERIOD	IMPORTS	EXPORTS	PERIOD	IMPORTS	EXPORTS
	1,000 pounds	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*
1896-1900	133,497	25,052	1926-30	319,505	437,628
1901-5	171,234	37,572	1931-35	327,454	357,295
1906-10	137,597	98,212	1936	271,076	450,796
1911-15	130,227	256,149	1937	324,668	511,174
1916-20	138,813	320,486	1938	307,439	612,148
1921-25	189,975	464,540			

Statistiques du Commerce et de la Navigation, Madagascar et Dépendances.

has supplied Madagascar chiefly with petroleum products, metal manufactures, electrical equipment, agricultural implements and machinery, paper manufactures, paints and varnishes, flour and other farinaceous foods, and tobacco.

Since 1935, when the value of exports exceeded that of imports by about 1.7 million dollars, Madagascar has maintained a favorable trade balance. France has accounted for approximately 80 percent of the export and 75 percent of the import trade by value (table 20).

In its foreign-trade policy, Madagascar has generally adopted customs tariffs similar to those of France, although on a few items lower import rates have been in force. A nominal duty on a variety of import items, nondiscriminatory as to origin, has furnished revenue to the island.

TABLE 20.—*Trade of Madagascar with principal countries, by percentage of total values, 1936-38*

COUNTRY	EXPORTS			IMPORTS		
	1936	1937	1938	1936	1937	1938
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
France	81.0	77.6	78.4	77.3	73.5	75.4
United States	3.4	4.9	5.4	3.9	4.7	5.3
United Kingdom	5.9	6.6	5.6	1.9	2.8	2.5
Réunion	2.5	2.8	3.3	.8	1.1	.9
Germany	1.0	1.2	.7	.6	.6	.5
Other countries	6.2	6.9	6.6	15.5	17.3	15.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances; Annuaire Statistique, France.

Coffee is the major cash export item, by value, with animals and animal products together coming second (table 21).

TABLE 21.—*Exports from Madagascar, 1936-38*

PRINCIPAL ITEMS	QUANTITY			VALUE					
				1936		1937		1938	
	1936	1937	1938	AMOUNT	PERCENTAGE OF TOTAL	AMOUNT	PERCENTAGE OF TOTAL	AMOUNT	PERCENTAGE OF TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Percent*	*1,000 dollars*	*Percent*	*1,000 dollars*	*Percent*
Coffee	61,266	46,768	90,838	8,260	31.2	4,821	20.2	7,524	31.9
Animals and animal products:									
Cattle	6,118	6,543	4,907	143	.5	126	.5	97	.4
Meats, fresh and prepared	27,194	29,769	24,595	2,168	8.2	2,152	9.0	1,658	7.0
Skins, green	13,285	16,660	12,668	1,608	6.1	2,490	10.4	1,247	5.3
Animal fats	3,622	4,054	3,854	317	1.2	375	1.6	264	1.1
Vanilla	1,195	690	831	2,371	8.9	2,285	9.6	2,143	9.1
Manioc, raw and prepared	77,720	74,051	91,832	1,957	7.4	1,650	6.9	1,332	5.7
Corn	35,016	74,956	118,775	477	1.8	1,057	4.4	1,238	5.3
Raffia	16,243	18,681	15,284	1,485	5.6	1,387	5.8	832	3.5
Sugar	18,649	20,898	26,678	776	2.9	975	4.1	1,045	4.4
Cloves	7,362	6,496	10,184	1,002	3.8	892	3.7	1,044	4.4
Essential oils	759	730	830	593	2.2	535	2.2	403	1.7
Vegetables, dried including ground	56,590	41,909	40,043	1,039	3.9	600	2.5	611	2.6
Tobacco, leaf	9,118	4,101	3,080	1,099	4.1	361	1.5	194	.8
Graphite	18,893	27,311	29,614	588	2.2	623	2.6	513	2.2
Gold, dust and ingots	1	1	1	431	1.6	397	1.7	406	1.7
Rum and tafia	[1] 2,390	[1] 1,714	[1] 2,804	192	.7	144	.6	176	.7
Others	-	-	-	1,986	7.7	2,991	12.7	2,856	12.2
Total	-	-	-	26,492	100.0	23,861	100.0	23,583	100.0

[1] 1,000 gallons.

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances; Annuaire Statistique, France.

In point of value, textiles rank highest among imports, constituting nearly 40 percent of the total value. The largest item is cotton piece goods, obtained predominantly from France. Only small quantities are imported from other countries, chiefly Indochina, England, the Netherlands, Japan, Czechoslovakia, and Belgium (table 22).

TABLE 22.—*Imports into Madagascar, 1936-38*

PRINCIPAL ITEMS	QUANTITY			VALUE					
				1936		1937		1938	
	1936	1937	1938	AMOUNT	PERCENTAGE OF TOTAL	AMOUNT	PERCENTAGE OF TOTAL	AMOUNT	PERCENTAGE OF TOTAL
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 dollars*	*Percent*	*1,000 dollars*	*Percent*	*1,000 dollars*	*Percent*
Cotton and rayon textiles	12,710	12,740	14,989	6,079	33.1	6,052	32.0	5,755	33.2
Other textiles, including thread	4,830	8,627	8,974	659	3.6	885	4.7	834	4.8
Iron and steel manufactures	36,469	41,297	[1] 21,471	3,444	18.8	3,641	19.2	[1] 1,913	11.0
Petroleum and petroleum products	27,136	34,365	41,292	990	5.4	1,059	5.6	1,202	6.9
Wines	[2] 1,572	[2] 1,534	[2] 1,774	946	5.2	873	4.6	801	4.6
Paper and paper products	2,308	2,789	3,791	306	1.7	377	2.0	471	2.7
Cement	58,012	59,502	50,876	392	2.1	334	1.8	281	1.6
Coal	35,986	40,926	65,011	191	1.0	190	1.0	314	1.8
Farinaceous foods	14,874	10,714	9,167	370	2.0	354	1.9	284	1.6
Rubber manufactures	591	679	741	283	1.5	279	1.5	263	1.5
Soaps, other than perfumed	5,655	5,324	5,249	320	1.8	321	1.7	203	1.2
Medicines, prepared	236	243	238	257	1.4	151	.8	134	.8
Others	-	-	-	4,104	22.4	4,411	23.2	4,892	28.3
Total	-	-	-	18,351	100.0	18,927	100.0	17,347	100.0

[1] Metal articles, other than machinery, not shown.

[2] 1,000 gallons.

Statistiques du Commerce et de la Navigation de Madagascar et Dépendances; Annuaire Statistique, France.

Metal manufactures, machinery, electrical equipment, automobiles, parts and accessories, iron, steel, and cast-metal items make up the second largest import category, or about 19 percent of the total value. Again, France is the chief source, but other countries are represented also, principally the United States, Germany, England, Denmark, Belgium, Canada, and Czechoslovakia.

Petroleum, heavy oils, and other petroleum products account for approximately 7 percent of the total. The principal sources are England, the United States, the Union of South Africa, the Netherlands Indies, and France. Coal and cement are important from the standpoint of volume. England and the Union of South Africa are the leading sources of coal; France and Indochina of cement.

Food imports consist principally of manufactured or processed items, such as flour, cereals, pastries, canned milk, dried vegetables, and preserved and dried fruits. France supplies most of the farinaceous foods, smaller quantities coming from India, the Netherlands, England, China, and other countries. Dried and preserved fruits are supplied chiefly by France, the Union of South Africa, India, the United States, China, and Algeria. Canned milk is imported from the Netherlands, France, Denmark, Belgium, and Switzerland.

SUMMARY AND CONCLUSION

There is no extensive manufacturing in Madagascar. Industrialization has been confined to the processing of raw materials for home consumption and for export, especially rice milling, sugar refining, essential- and vegetable-oil extraction, processing of manioc into tapioca or flour, meat packing, and pottery making. Standardized grading for export of specific natural and industrial products has been required since 1931. The island is rich in minerals, particularly graphite, and its importance as a world source is indicated by the flow of exports to industrial world centers. However, the possibilities of agriculture and other extractive industries have been only partially developed.

The dominant retarding factors, perhaps, have been the inadequacy of native labor and the lack of ample transportation and communication. In all probability the island is capable of sustaining many times its present population, but the high native birth rate has been offset largely by a high mortality rate, especially among infants. More attention to medical and health facilities, to insure a normal growth in population and to improve the labor capacity per worker, or the importation of foreign labor is deemed essential to accelerate substantially the economic development of Madagascar.

A comprehensive public-works program, including extension of irrigation projects, building of better roads, particularly in backward areas, and development of hydroelectric potentialities, would greatly increase the productivity of this land rich in natural resources.

§